TELEPORT

Human Systems Integration (HSI) Assessment: Manpower, Personnel, Training, & Human Factors Engineering

For MANPRINT Practitioner's Workshop 19

August 2004

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Satellite Comm. Stations

Agenda

- Description of HSI methodology
- Manpower requirements assessment
- Personnel knowledge(s), skills and aptitudes (KSAs) assessment
- Training requirements assessment
- Human factors engineering assessment

Assessment Approach to Manpower Requirements

- **Visits to 7 future Teleport sites (structured interviews)**
- **Assessed current operations & maintenance manpower requirements**
- **Anticipated/predicted Teleport maintenance manpower requirements**
- **Also visited RNOSCs, CONEXs & RSSCs to assess Teleport impact on Manpower, Personnel Skills & Training**
- **Examined potential Teleport operations manpower requirements**
  - **ORD Requirements (peacetime & surge to MTW)**
  - **Two conditions:**
    - **Current distribution of missions continues (status quo)**
    - **Future GMF missions allocated based on capacity; Navy C4I missions distributed based on expected user requirements**

Highlights of Manpower Requirements Assessment

Assumptions:

- **Current manning levels at the seven sites are not excessive**
- **Planning process for C & Ku band missions will be virtually identical to planning X band missions**
- **Teleport missions will require less trouble-shooting and coordination than current STEP missions**
- **The number of peacetime missions will grow by 50%**

Assumptions (con't)

- **Concerning support for an MTW**
  - **All peacetime missions will be dropped or shift to other sites**
  - **MTW will consume the supporting site's mission capacity**
  - **Site will experience a major surge, then relative stability**
- **Teleport UHF missions will have manhour requirements similar to those associated with Navy C4I missions**
- **Additional personnel acquired to support Teleport predominately will be contractor personnel or government civilians**

Maintenance vs. Operations

- **Maintenance assessment is fairly straight forward**
- **No such thing as a “standard mission”**
- **Teleport manpower requirements impact on operations will be greater than impact on maintenance**

Teleport Operations Manpower Assessments

	Requirement	Condition
A	Meets peacetime opns for one year	Current distribution remains valid; 50% growth each site
B	Surge: 6 mos peacetime opns + 6 mos support to MTW	Current distribution remains valid; 50% growth each site
C	Meets peacetime opns for one year	GMF msns allocated (capacity); Navy C4I msns distributed (expected procedures)
D	Surge: 6 mos peacetime opns + 6 mos support to MTW	GMF msns allocated (capacity); Navy C4I msns distributed (expected procedures)

Manpower Recommendations

	North-west	Camp Roberts	Fort Buckner	Wahi-awa	Lago Patria	Ram-stein	Land-stuhl
A	8.3	6.2	7.4	10.0	4.7	3.3	3.3
B	11.9	11.8	12.2	12.3	10.5	4.3	6.5
C	5.4	11.6	9.1	0.7	11.5	1.1	4.2
D	10.5	14.5	13.1	7.7	13.9	3.2	7.0
TPO FTE Projection	9	9	9	9	9	5	5
WGI's HSI Recomend	11	13	13	10	12	4	7

Total: Teleport requires ~70 more people

Assessment Approach for Personnel KSAs

- Examined KSAs currently required of uniformed, civil servant & contractor operators/maintainers
- Analyzed KSAs required at commercial Teleport, at Northwest (C), and at Ramstein (C & Ku)
- Queried numerous, experienced SATCOM professionals
- Compared military SATCOM career specialties to commercial certifications and commercial job descriptions

Highlights of Personnel Skills Assessment

- **Military KSAs very comparable to commercial Teleport KSAs**
- **Virtually unanimous opinion of SATCOM professionals interviewed: "While Teleport equipment will operate over a different portion of the frequency spectrum, *the basic principles and fundamentals* or the equipment and operations will be the same**
- **Confirmed by Site Manager of Commercial Teleport (former military SATCOM operator)**
- **Expect some new techniques & procedures, but no new skills anticipated**

Highlights of Personnel Skills Assessment (con't)

- **Some inquisitiveness expressed:**
  - **Acquiring & tracking commercial satellites**
  - **Planning & coordinating C & Ku missions**
  - **New equipment (e.g., MIDAS)**
- **New skills with new generations of Teleport?**
  - **Extremely High Frequency (EHF)**
  - **Internet Protocol (IP)**

Assessment Approach for Training Requirements

- Reviewed current SATCOM training programs
  - Formal & informal
  - On site & Schoolhouse
- Site Readiness Certification
- Assessed New Equipment Training (NET) & envisioned sustainment training
- Explored alternative training options

Highlights of Training Assessment

- **Site certification is a major factor for uniform staffed sites, a minor issue for contractor run sites**
- **Army Signal School responding to requests from the field – operating under time & funding restraints**
- **Site certification will continue under Teleport; but expect additional Teleport personnel will be civil servants or contractors; certification of new personnel should not increase**
- **Sustainment training will be very important for Teleport sites**
  - **Computer Based Training (CBT)**
  - **Visiting, formal training courses (e.g., ISEC)**
  - **Distance Learning**

Highlights of Training Assessment (con't)

- **There seems to be a need for some *centralized* Teleport *systems level training***
- **Placing commercial equipment at Ft. Gordon is not practical for small density MOS training**
- **Idea for specialized Teleport training at Ft. Monmouth SEL (TDY/TAD en route) popularly received at sites**
- **DISA should develop Teleport training / certification standards that local commanders can modify/build-on to suit their specific sites**

Human Factors Engineering (HFE) Evaluation of 7 Teleport Sites

- In 2002, visited each of 7 stations; examined:
  - Technical documentation
  - Engineering drawings
  - Existent layout of floor plans
  - Teleport insertion plan layout
  - Workplace modification plans & specifications
- Critiqued envisioned adjustments to operator & maintainer procedures
- Critiqued control console & work station design re: MIL-STD-1472, MIL-HNDBK-759, general HFE Stnds
- Identified potential human factors issues; making recommendations

Design Standardization of Teleport Stations is Desired

- Desire for common use Teleport language and terminology across Teleport & all telecommunication stations (should be driven by DISA)
- Functional & information flow within stations
- Operating & maintenance procedures, worker certification & quality assurance should be standardized
- Design and layout of operator control center work stations (hubs) should be standardized among sites

Human Engineering Observations

- Sites were then, and now still are undergoing significant renovations & floor plan changes
- Intermingling & integration of new & legacy equipment alters flow of information & of work
- Layout of operator control center hubs affected
- Operating & maintenance procedures slightly altered
- Many COTS rack-mounted equipments differ by type/ manufacturer; not easily altered for HFE suggestions
- Equipment labeling inconsistent; each site improvised own labeling scheme; some innovations observed should be adopted Teleport-wide

Operator Control Center Hub Design

- Control console layouts at each site differ; some are laid out better than others; some now could use a HFE scrub/reconfiguration
- Shortage, inefficient use of operator console space
- Proliferation, duplication (excess?) of computer towers, CRTs, printers, mounted in prime real estate
- Alternative operator console design suggested at Okinawa Space Command is not really better

Space Command's Operations Floor Okinawa, Japan

HFE Recommendations for Operator Control Center Hubs

- Now with perspective of HFE criteria, should re-examine functional groupings of computers, controls, displays, printers, etc. at various sites
- Should consolidate, reposition some equipments
- MIDAS offers unique opportunities to combine equipments, reposition many operator functions
- Could acquire flat panel displays vice CRTs to conserve VDT space; reposition computer towers
- Should make adjustments to lighting for prevention of reflections, glare at operator consoles, on VDTs, etc.

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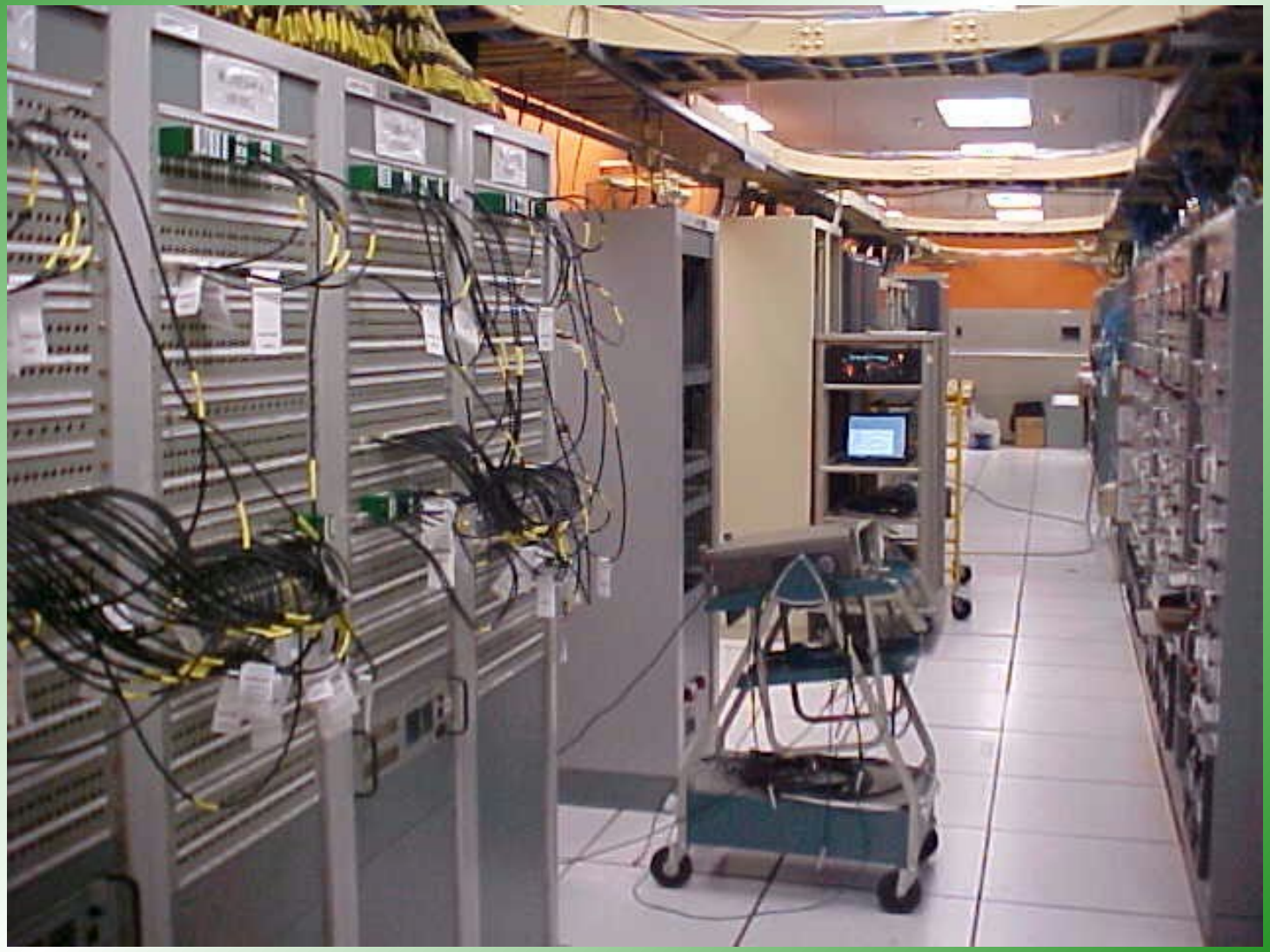
HFE of General Station Design

- Found a variety of labeling schemes for individual equipments & the racks for them
- Most labels are small font; not of good contrast; difficult to read, esp. in poor lighting
- Logic flow of equipment labeling is not consistent within several stations
- Use of color coding varies, and also is not consistent within & across stations



Operator & Maintainer Manuals

- Each station has its own “system” of maintaining, filing, storing, updating & making manuals available for operations and maintenance personnel
- Completeness of sets of manuals varies among sites; mostly true of manuals for legacy COTS equipments
- Some manuals are not being regularly updated
- Quality of written manuals themselves varies
- Stations should attend to matters of updating, accessibility, & reliable storage of all manuals
- Mgmt should help sites ensure user-friendly equipment, resource systems for manuals on all new Teleport terminals & stations
- Electronic media, CD-ROMs, etc. should be considered, and adopted where we can

Other HFE Considerations

- Maintenance trouble shooting equipment and procedures appeared okay
- Acoustical noise & air ventilation systems ok
- Compliance w/Americans with Disabilities Act
- High voltage, 2- person operation and safety
- Should retain employee break rooms at sites

Ongoing HSI Actions for Teleport

- Complete all reviews of Teleport Generation One HSI Reports (Finalize them)
- Assessing personnel skills & training impact of fielding EHF & Generation II Teleport equipment
- Continuing involvement in assessment of Teleport training (NET & sustainment training) requirements
- Assisting in development of Teleport Master Training Plan
- HSI assessment of impact of IP on Teleport operations

Questions ?

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